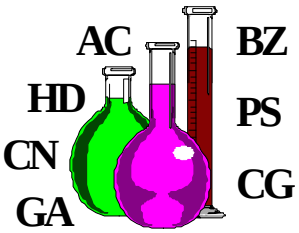
U.S. Army Center for Health Promotion and Preventive Medicine

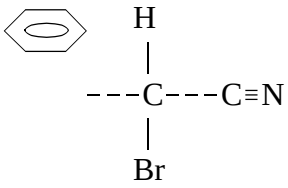


Detailed Facts About Tear Agent Bromobenzylcyanide (CA)

218-18-1096

Physical Properties of Tear Agent Bromobenzyclcyanide

Chemical Structure



Chemical Formula	C_8 H6 BrN
Description	Pure bromobenzylcyanide is a colorless crystalline solid with a sour or rotten fruit odor.
Molecular Weight	196.0
Boiling Point	242°C
Vapor Pressure (mm Hg)	0.11 @ 20°C
Freezing Point	25.5°C
Density	Solid = 1.52 @ 20°C Liquid = 1.47 @ 25°C Vapor = 4.0 (air = 1)
Solubility	Soluble in organic liquids. Insoluble in water and cold alcohol; also, soluble in phosgene, chloropicrin, and benzyl cyanide.
Flash Point	None; decomposes but does not burn.

Agent CA - The chemical 4-Bromophenylacetylnitrile, Chemical Abstract Service Registry No. 16532-79-9.

Volatility	17 mg/m^3 @ 0°C 115 mg/m^3 @ 20°C 217 mg/m^3 @ 30°C
Toxicity Values	ICt_{50} = 30 mg-min/m^3 (approximately) LCt_{50} = 8,000 to 11,000 mg-min/m^3 (estimated)

Exposure Limits

Workplace Time-Weighted Average - No standard available
General Population Limits - No standard available

Toxic Properties of Bromobenzylcyanide

CA was the first tear agent that came into existence at the end of the World War I. It was outmoded in 1920 with the introduction of the CN series and is now obsolete in NATO inventories. The tear compounds cause a flow of tears and irritation of the skin. Because tear compounds produce only transient casualties, they are widely used for training, riot control, and situations where long-term incapacitation is unacceptable. When used against poorly equipped guerrilla or revolutionary armies, these compounds have proved extremely effective. When released indoors, they can cause serious illness or death.

Overexposure Effects

CA is usually used in solution with ether or acetone as an aerosol. It produces a severe burning sensation to the mucous membranes and equally severe lacrimination to the eyes accompanied by headache and nausea. The nausea may lead to vomiting although the vomiting is more of a psychological reaction than physiological. CA will go into solution with human sweat and will incur a burning sensation to the face, especially in the areas around the mouth, nose, and eyes. It will penetrate clothing, making the areas around the neck, armpits, the tender skin areas behind the elbows, knees and around the buttocks and crotch susceptible to rashes and blisters. The vapors can be lethal in enclosed or confined spaces within a few minutes without prior respiratory protection. Nausea can lead to unconsciousness which may mean suffocation.

Emergency and First-Aid Procedures

Inhalation: remove victim from the source immediately; seek medical attention immediately.

Eye Contact: don a respiratory protective mask; flush eyes immediately with copious amounts of water; seek medical attention immediately.

Skin Contact: remove victim from the source immediately; decontaminate the skin immediately with copious amounts of water; decontaminate clothing with steam or by boiling; 20 percent alcohol caustic soda is effective on material, but may damage it; seek medical attention immediately.

Ingestion: give victim milk to drink; seek medical attention immediately.

Protective Equipment

Protective Gloves:	Wear Butyl toxicological agent protective gloves (M3, M4, or glove set).
Eye Protection:	Wear chemical goggles; wear a mask/respirator in open areas.
Other:	Wear a complete set of protective clothing to include gloves and lab coat with a respiratory mask readily available.

Reactivity Data

Stability:	Stable in glass, lead-lined, or enamel-lined containers; reaction with iron may be explosive.
Hydrolysis Rate:	Very slow.
Hydrolysis Products:	Complex condensation products.
Corrosive Properties:	Vigorous corrosive action on all common metals except lead; reaction with iron may be explosive.
Persistency	Depends on munitions used and the weather; heavily splashed liquid persists one to two days under average weather conditions.

References

1. Department of the Army Field Manual (DA FM) 3-9, *Potential Military Chemical/Biological Agents and Compounds,* 1990.

2. *The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Eleventh Edition,* Rahway, New Jersey, 1989.

3. U.S. Army Chemical Command Materiel Destruction Agency, *Site Monitoring Concept Study,* 15 September 1993.

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